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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/937,653	01/18/2002	Giovanni Brandi	05788.0183	5121
22852	7590	04/02/2004	EXAMINER	
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 1300 I STREET, NW WASHINGTON, DC 20005			ARTMAN, THOMAS R	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 04/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/937,653	BRANDI ET AL.	
	Examiner	Art Unit	
	Thomas R Artman	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2004.
- 2a) ☐ This action is **FINAL**.      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 30-58 is/are pending in the application.
- 4a) Of the above claim(s) 30-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 40-44, 48-56 and 58 is/are rejected.
- 7) ☒ Claim(s) 45-47 and 57 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 40, 44, 49, 50, 53-56 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergano (US 5,440,659) in view of Adams (US 5,649,043).

Regarding claim 40, Bergano discloses an optical fiber cable (Fig. 1 and described at least in col.3, lines 3-6 and lines 29-48), including:

- 1) at least one optical fiber (item 20),
- 2) a substantially strand-like central member (item 18),
- 3) a layer of polymer material (item 22) which is substantially devoid of discontinuities and incorporates the central element and the at least one optical fiber, and
- 4) the PMD in the fiber is less than 110% of the PMD in a non-cabled optical fiber (col.1, line 57, to col.2, line 2).

Bergano does not disclose that the optical fiber is arranged along an open helix trajectory. Bergano's fibers are arranged in close helices.

Adams teaches that it is known to use either open or closed helical trajectories in optical fiber cables (col.1, lines 29-45). Adams further states throughout the Summary that the invention can use either trajectory.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Bergano's cables to be wound in an open helix trajectory as it is a recognized functional equivalent in the art, in the absence of a showing of criticality or unexpected results obtained. Thus, selection of an open helix trajectory over a closed helix trajectory would be based upon preference.

With respect to claim 44, Bergano discloses 6 optical fibers, which falls within the specified range of 2 to 24 optical fibers.

With respect to claim 49, Bergano's cable has a plurality of optical fibers arranged in a ring equidistant from each other and at a common distance from an axis of the cable.

Regarding claims 50 and 53-56, the various dimensions, including:

- 1) the thickness of the polymer layer (claim 53),
- 2) the diameter of the central member (claim 54),
- 3) the radius of the ring of optical fibers (claim 50), and
- 4) the diameter of the optical fiber cable (claims 55-56),

fall within the scope of customary practice of persons with ordinary skill in the art, particularly in the absence of a showing of criticality or unexpected results being obtained by the

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applicant. It would have been obvious to one of ordinary skill in the art at the time the invention was made to achieve the claimed dimensions as a matter of optimizing such parameters through routine experimentation.

Regarding claim 58, the recited polymers, particularly polyolefins and polyamides, are ubiquitous throughout the art for use in optical fiber cable construction and their selection falls within common practice to those skilled in the art based upon availability, in the absence of a showing of criticality or unexpected results obtained.

Claims 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergano and Adams, as applied to claim 40 above, in view of Norman (US 6,035,086).

Regarding both claims, Bergano does not specifically disclose torsion ranges of 0.05 to 1.5 turns/m, or more specifically, 0.1 to 1 turns/m. However, Bergano teaches that applying any amount of torsional strain (twist) to the fiber improves the PMD characteristics of the fiber, and cites an optimum range of twists to be about 2-4 turns/m (col.6, line 63, to col.7, line 14), where significant improvement in performance is obtained up to 2 turns/m and any more than 4 turns/m causes too much losses in the fiber due to excessive strain.

Norman also teaches of various design concerns regarding the improvement of PMD characteristics in optical fiber cables. Norman states, in col.2, lines 1-6, that the fibers can be twisted one full turn every 1 to 10 meters. This range contains values which fall within the claimed ranges of claims 41 and 42.

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a torsional strain on Bergano's fibers within the range of 0.1 to 1 turns per meter since improved PMD characteristics will be attained without causing unacceptable optical losses.

Claims 43 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergano and Adams, as applied to claim 40 above, in view of Hart (US 5,418,881).

Regarding claim 43, Bergano does not disclose that the net torsional strain is zero.

Hart teaches, in col.3, lines 6-50, that an inverted relationship, where the twists alternate in direction, provides a more efficient method for minimizing PMD dispersion in an optical fiber. As further stated, in col.4, line 58, to col.5, line 4, Hart teaches that essentially zero net strain is necessary in order to minimize optical transmission losses. In this way, the local torsional strain along the length of the fiber is non-zero in order to improve the PMD characteristics while providing an overall (net) strain of zero in order to minimize optical transmission losses.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bergano's optical fiber cable to have essentially zero net torsion through the use of the inverted twisting arrangement as taught by Hart. In this way, the higher strain that causes optical losses can be more easily averted while improving the PMD characteristics of the optical fiber cable.

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Regarding claim 48, Bergano does not disclose an inversion pitch, particularly within the range of 0.5 to 5 meters.

Hart teaches, in col.3, lines 6-50, that non-uniform torsional strain has advantages for efficient minimization of PMD distortion in the fiber (improved PMD characteristics). Specifically, Hart teaches that positive and negative twisting (inverted pattern) is more efficient without causing high strains in the fiber that causes optical transmission loss, particularly with an inverted pitch of around 4m.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bergano's pitch to an inverted pitch within the range of 0.5 to 5m as taught by Hart in order to improve the efficiency of reducing PMD distortion in the optical signal. In this way, Bergano's design can further avoid the known optical losses caused by the strain from using high turns/m (which also correspond to high pitch) while improving the PMD characteristics of the fiber.

Claims 51 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergano and Adams, as applied to claim 40 above, in view of Spooner (US 6,363,192).

Regarding claim 51, Bergano does not disclose the use of two rings of optical fibers.

Spooner teaches the use of multiple evenly-spaced rings of optical fibers at different distances from a common axis.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bergano's cable to include an additional ring of optical fibers such that

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more fibers can be carried in the same cable. This provides for a more compact transmission line.

With respect to claim 52, the claimed radii of the two rings of fibers fall within the scope of customary practice of persons with ordinary skill in the art, particularly in the absence of a showing of criticality or unexpected results being obtained by the applicant. It would have been obvious to one of ordinary skill in the art at the time the invention was made to achieve the claimed dimensions as a matter of design preference by optimizing such parameters through routine experimentation.

#### ***Allowable Subject Matter***

Claims 45-47 and 57 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art made of record, alone or in combination, does not teach or reasonably suggest the additional limitation of having a maximum torsion angle less than the maximum winding angle as claimed in claim 45. Bergano specifically states that the winding angle and the torsion angle are the same (col.4, lines 1-24). The remaining prior art does not specify such parameters.

Claims 46 and 47 are allowable by virtue of their dependency.



The prior art of record, alone or in combination, fails to teach or reasonably suggest the additional limitations of the polymer material having a bending modulus of between 20 MPa and 70 MPa, a Shore D hardness factor of between 15 and 70 and Melt Flow Index of between 5 and 15 as claimed in claim 57.

### ***Response to Arguments***

Applicant's arguments with respect to claim 40 have been considered but are moot in view of the new ground(s) of rejection.

Regarding the 35 USC § 103 rejections of claims 50 and 52-56, the applicant has not shown or stated that the specific dimension values claimed have any criticality toward solving any stated or long-standing problems in the art. The applicant also has not shown that unexpected results were obtained from the implementation of the claimed dimensions. Furthermore, the prior art does not ascribe criticality or unexpected results to such dimensions, as these dimensions are rarely specified. Therefore, the specific values are determined to be obvious over routine experimentation of the skilled artisan for optimizing design parameters.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lepri (US 5,127,076) teaches an optical fiber cable with fibers in an open-helix trajectory. Bortolin (US 4,842,438) and Priaroggia (US 4,697,875) teach functional equivalence of open or closed helical arrangements for optical fibers in cables.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R Artman whose telephone number is (571) 272-2485.

The examiner can normally be reached on 9am - 6:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas R. Artman  
Patent Examiner  
March 25, 2004



EDWARD J. GLICK  
SUPERVISORY PATENT EXAMINER